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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/701,215

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Jiaqi Xiao

1391-44800 RMT

5162

23505

7590

08/31/2005

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EXAMINER

JONES, DIANE ELIZABETH

ART UNIT

PAPER NUMBER

2862

DATE MAILED: 08/31/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/701,215

Applicant(s)

XIAO ET AL.

Examiner

Diane E. Jones

Art Unit

2862

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 13 July 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-38 is/are pending in the application.
- 4a) Of the above claim(s) 1-5 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 23-25, 27, 32 and 35-38 is/are allowed.
- 6) ☒ Claim(s) 6-14, 16, 17, 19-22, 26, 28, 30, 33 and 34 is/are rejected.
- 7) ☒ Claim(s) 15, 18, 29 and 31 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Claim Objections***

1. Claim 31 is objected to because of the following informalities:  $I_B$  and  $I_T$  are not defined. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 26 is rejected under 35 U.S.C. 112, second paragraph. Claim 26 recites the limitation "the look-up table" in Line 1. There is insufficient antecedent basis for this limitation in the claim.

3. Claims 33 and 34 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

4. With respect to Claims 33 and 34, the term "N" is a relative term which renders the claims indefinite. The term "N" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. The term N has no upper limit. There cannot be an infinite number of coils in the invention.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 6-14, 16-17, 19-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Sinclair et al. (5065099).

6. With respect to Claim 6, Sinclair et al. disclose a well-logging tool (induction tool, Col. 3, Line 15) which comprises a transmitter and a plurality of receivers on the tool (plurality of transmitter coils and receiver coils on the sonde, Col. 3, Lines 23-28 and Fig. 3, Items 120, 124 and 130) and a bucking device disposed on the tool (bucking coils, Col. 3, Lines 48-53 and Fig. 3, Items 136, 128, 132 and 134) wherein the bucking device adaptively cancels a signal induced in at least one of the transmitter or the plurality of receivers (bucking coils wound in opposition to receiver coil cancel any signals coming from the transmitter, Col. 5, Line 62 to Col. 6, Line 6)

7. With respect to Claims 7-9, Sinclair et al. disclose the invention as shown in Claim 6 above, and further teach that the transmitter, receivers (plurality of transmitter coils and receiver coils, Col. 3, Lines 23-28) and bucking devices are coils (bucking coils, Col. 5, Line 67 to Col. 6, Line 1),

8. With respect to Claim 10, Sinclair et al. disclose the invention as shown in Claim 6, and further discloses that the receiver is a single component receiver (

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receiver coils arranged on the sonde, Col. 3, Lines 25-28, this is single component since the coil points in one dimension only).

9. With respect to Claim 11, Sinclair et al. disclose the invention as shown in Claim 6 above, and further teach that the transmitter coil and the bucking coil are wound around a desired axis in opposite directions (bucking coil wound in opposite sense to transmitter coil, Col. 4, Lines 6-12).

10. With respect to Claim 12, Sinclair et al. disclose the invention as shown in Claim 6 above, and further teach that the transmitter and the receiver are separated by predetermined distances (main receiver coils are spaced by a distance  $D$  from the transmitter, Col. 18, Lines 37-46) and that the distances are different for each receiver in the plurality ( $D/d$  ratio, Col. 7, Lines 1-14, also Col. 6, Lines 33-34 and Line 65, referring to coil turns and distances necessary for balance).

11. With respect to Claim 13, Sinclair et al. disclose the invention as shown in Claim 6 above, and further teach that the receivers receive signals and a portion of the received signals are direct coupling signals from the transmitter, where the bucking device minimizes the magnitude of the signal that is directly coupled from the transmitter to the receivers (bucking receiver coils buck out mutual coupling as seen by the receiver array, Col. 6, Lines 1-6).

12. With respect to Claim 14, Sinclair et al. disclose the invention as shown in Claim 6 and 13 above, and further teach that minimizing the magnitude is determined by an amount of current in the bucking device (the magnetic field of the transmitter induces a current in the bucking coil which in turn produces a magnetic field opposite in

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sense, Col. 4, Lines 9-11, to the transmitter field as seen by the receiver, thus cancelling this direct coupled field (see definition of bucking coil, attached) .

13. With respect to Claim 16, Sinclair et al. disclose a method of induction well-logging comprising:

Transmitting a first signal with a transmitter (alternating frequency signal will inductively produce and electromagnetic field, Col. 19, Lines 43-62);

Receiving a second signal with a receiver, wherein the second signal comprises a first portion and a second, wherein the first portion is directly coupled from the transmitter and the second portion is indirectly coupled from the transmitter portion (receiver detects in phase and out of phase signal where the phase is relative to the current in the transmitter, Col. 6, Lines 14-23, also, in phase signal is mutually coupled, out of phase is the secondary magnetic field, Col. 19, lines 56-62);

Transmitting a third signal with a bucking device wherein the third signal minimizes the magnitude of the first portion of the second signal (bucking coils buck out mutual coupling from the transmitter, Col. 20, Lines 42-47) and wherein the magnitude of the third signal is different from the magnitude of the first signal (bucking coils have taps to adjust number of turns (Col. 20, Lines 51-54) and fewer turns than receiver coils, Col. 20, Line 67 to Col. 21, Line 3, the signal produced is proportional to the number of turns, Col. 5, Lines 43-46).

14. With respect to Claim 17, Sinclair et al. disclose the invention as shown in Claim 16 above, and further teach that the current in the bucking device is pre-calculated (see equation for mutual balance, (Col. 6, Line 65), the number of turns determined in this equation determine the dipole moment of the coil, which is related to the current in the coil (Col. 5, Lines 41-46)).

15. With respect to Claim 19, Sinclair et al. disclose the invention as shown in Claim 16 above, and further teach that the receiver is a single-component receiver (receiver coils arranged on the sonde, Col. 3, Lines 25-28, this is single component since the coil points in one dimension only).

16. With respect to Claim 20, Sinclair et al. disclose the invention as shown in Claim 16 above, and further teach that the bucking device and the receiver are separated by a predetermined distance (distances determined for transmitter, receiver and bucking coils by equation referring to coil turns and distances necessary for balance, Col. 6, Lines 33-34 and Line 65).

17. Claims 21 and 22 are rejected under 35 U.S.C. 102(b) as being anticipated by Koelle et al. (4264862)

18. With respect to Claim 21, Koelle et al. disclose a well-logging tool (logging tool, Col. 1, Lines 8-10), comprising:

A first sub-array comprising transmitting, bucking and first receiving coils (transmit coil, Col. 5, Lines 24-38 and Fig. 2, Items 32A, 34A and 35A);

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A second sub-array comprising transmitting, bucking and second receiving coils (transmit coil, Col. 5, Lines 24-38 and Fig. 2, Items 32A, 34A and 35B);

Where the first and second receiving coils receive signals that are directly coupled from the transmitting coil and indirectly coupled from the transmitting coil (unwanted signal out of phase with the desired signal, Col. 4, Lines 26-32): and

Where the bucking coil minimizes the magnitude of the signals that are directly coupled from the transmitting coil to the receiving coil (transformer signal reduced by bucking, Col. 4, Lines 31-32).

19. With respect to Claim 22, Koelle et al. disclose the invention as set forth in Claim 21 and further teach that the minimization of the magnification provided by the bucking coil is determined by a current in the bucking coil (oscillator and coil driver feed the bucking coil 34A, Col. 5, Lines 29-31 and Fig. 2, Items 37 and 34A).

20. With respect to Claim 28, Koelle et al. disclose a method of induction logging (logging device for detecting and mapping fractures in earth, Col. 1, Lines 8-10 and transmitting a signal into rock and receiving the signal, Col. 2, Lines 8-11), comprising;

Providing a signal with a transmitting coil (transmit coil, Col. 5, Lines 24-38 and Fig. 2, Item 32A);

Receiving the signal with a plurality of receiver coils (receiver coils 35A and 35b, Col. 5, Line 31 and Fig. 2), where the signal received by each receiver coil comprises directly and indirectly coupled portions (unwanted signal out of phase with the desired signal, Col. 4, Lines 26-32);



Providing a current to a bucking coil with a current controlling device (oscillator and coil driver feed the bucking coil 34A, Col. 5, Lines 29-31 and Fig. 2, Items 37 and 34A, ) which selectively couples to at least one receiver in the plurality of receiving coils (direct coupled signal is balanced by cancellation coils (bucking coils), Col. 6, Lines 39-42, balancing is determined by adjusting distances between bucking and receiver coils(Eq. 14, Col. 4, Lines 50-57) and varying the current provided to the bucking coil (current provided to the bucking coil is alternating current from the oscillator, Col. 5, Lines 29-31 and definition of "oscillator", see attached reference).

21. With respect to Claim 30, Koelle et al. disclose the invention as shown in Claim 28 above, and further teach minimizing the magnitude of the first portion of the received signal using the bucking coil (direct coupled signal is balanced by means of the cancellation coil, Col. 6, Lines 39-42).

### ***Allowable Subject Matter***

22. Claims 15, 18, 29 and 31 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

23. Claims 23-25, 27, 32, 35-38 are allowed.

### ***Conclusion***

24. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. 6100696, 6600995, 6606565 as disclosing well-logging tools with bucking coils.

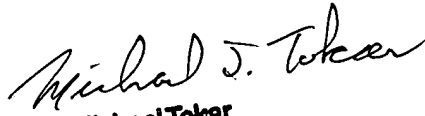
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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Diane E. Jones. The examiner can normally be reached on M-F.

The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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